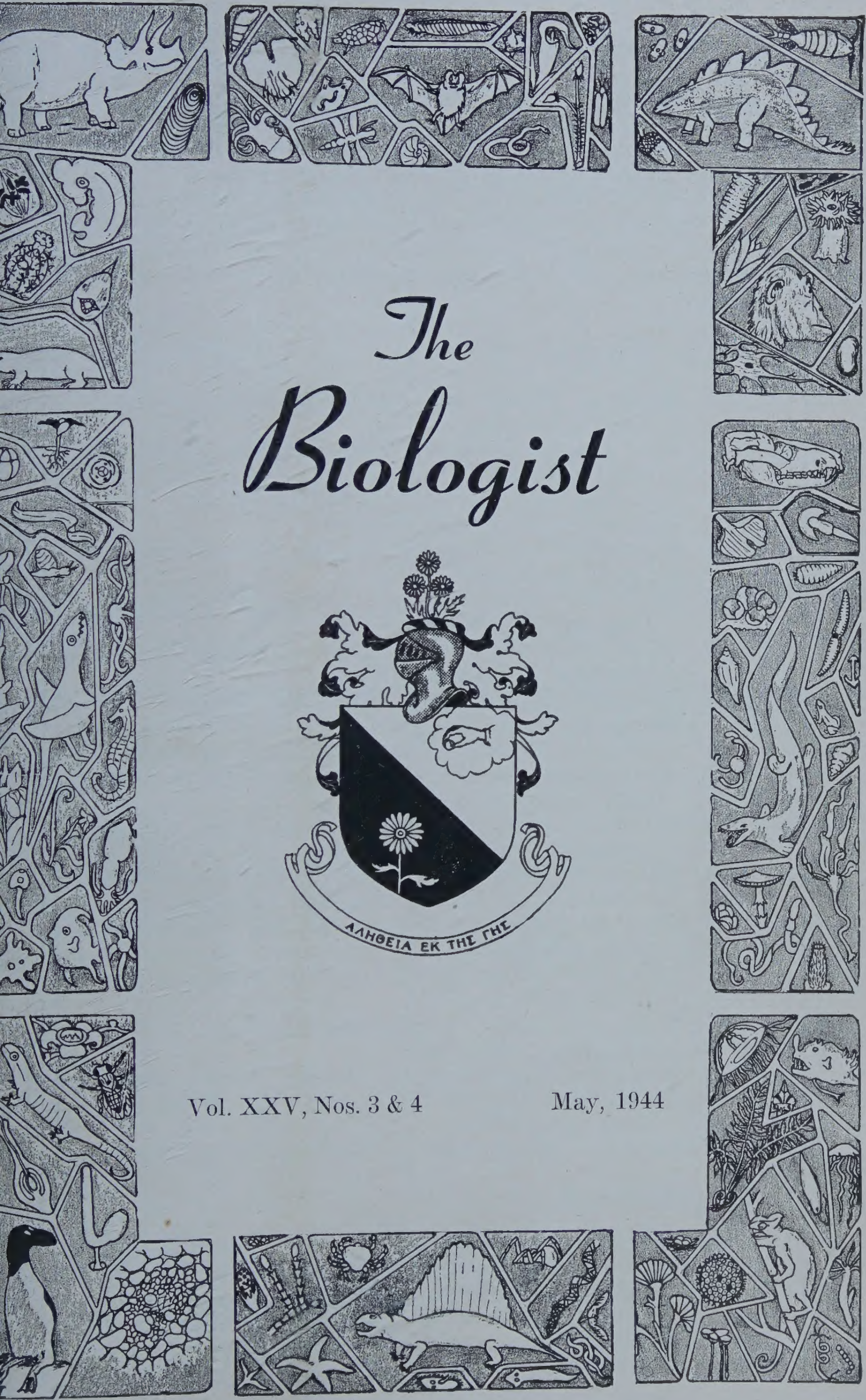

The Biologist

Vol. XXV, Nos. 3 & 4 May, 1944

Phi Sigma

BIOLOGICAL HONOR SOCIETY

"The object of Phi Sigma is to promote interest in biological research. Although originally designated as an honorary biological research society, it should not be considered as a working guild of biologists interested in research. In effect, election to Phi Sigma should be an opportunity for better work, rather than merely election to an honorary society."

Mile Posts:

1915 March 17, Alpha Chapter organized, Ohio State University, Columbus.
1916 May, Central Governing Body organized, BIOLOGIST first issued.
1917 June, last War-time BIOLOGIST issued.
1921 February, BIOLOGIST revived.
1924 December, First National Meeting, Constitution revised, Washington, D.C.
1925 December, Second National Meeting, First Science Program, Kansas City.
1926 December, Third National Meeting, Second Science Program, Philadelphia.
1927 December, Third Science Program, Nashville.
1928 December, Fourth National Meeting, Coat-of-Arms adopted, Fourth Science Program, New York.
1930 January, Council Meeting, Ritual Revised, Norman, Okla.
December, Fifth National Meeting, Fifth Science Program, Cleveland.
1931 Phi Sigma Letters Registered, U. S. Patent Office.
1932 December, Sixth Science Program, Atlantic City.
1933 June, Sixth National Meeting, Seventh Science Program, Chicago.
1935 December, Seventh National Meeting, Eighth Science Program, St. Louis.
1937 December, Eighth National Meeting, Ninth Science Program, Indianapolis.
1939 December, Ninth National Meeting, Tenth Science Program, Silver Anniversary, Ohio State University, Columbus.
1942 December, Tenth National Meeting, Dallas, Texas.

Expansion:

The Constitution provides that: "An active chapter may be established in any institution of learning which requires for graduation the equivalent of four years of collegiate work, and which is equipped with facilities for research work. - - - - Any petitioning group must be active for at least one year before it may be granted a charter."

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OF ALL ACTIVE AND INACTIVE CHAPTERS

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ALPHA

Ohio State University, Columbus, Ohio, founded March 17, 1915, (Inactive).

BETA

University of Michigan, Ann Arbor, Michigan, founded June 3, 1916.

DELTA

University of Maine, Orono, Maine, founded January 27, 1917, (Inactive).

EPSILON

University of Denver, Denver, Colorado, founded March 5, 1917.

ZETA

University of Wisconsin, Madison, Wisconsin, founded May 30, 1917.

ETA

University of Akron, Akron, Ohio, founded April 20, 1921.

THETA

Michigan State College, East Lansing, Michigan, founded April 9, 1921, (Inactive).

IOTA

Washington University, St. Louis, Missouri, founded May 28, 1921.

KAPPA

University of Kansas, Lawrence, Kansas, founded May 31, 1921.

LAMBDA

Montana State University, Missoula, Montana, founded May 4, 1921.

MU

University of California, Berkeley, California, founded April 27, 1922.

NU

Washington and Jefferson College, Washington, Pennsylvania, founded May 11, 1922.

XI

University of Nebraska, Lincoln, Nebraska, founded May 3, 1934, (Inactive).

OMICRON

University of North Dakota, Grand Forks, North Dakota, founded May 26, 1924, (Inactive).

PI

Emory University, Georgia, founded January 3, 1925.

RHO

University of Illinois, Urbana, Illinois, founded March 28, 1925.

SIGMA

University of Florida, Gainesville, Florida, founded December 4, 1925.

TAU

Duke University, Durham, North Carolina, founded March 4, 1926.

UPSILON

Miami University, Oxford, Ohio, founded May 7, 1926.

PHI

University of New Hampshire, Durham, New Hampshire, founded May 21, 1926.

CHI

Montana State College, Bozeman, Montana, founded February 11, 1927.

PSI

University of Washington, Seattle, Washington, founded April 7, 1928.

OMEGA

University of Oklahoma, Norman, Oklahoma, founded March 24, 1928.

ALPHA ALPHA

University of Southern California, Los Angeles, California, founded March, 1928

ALPHA BETA

Mount Union College, Alliance, Ohio, founded May 17, 1928.

ALPHA GAMMA

University of South Dakota, Vermillion, South Dakota, founded May 15, 1928, (Inactive).

ALPHA DELTA

Lawrence College, Appleton, Wisconsin, founded March 7, 1929, (Inactive).

ALPHA EPSILON

University of Pittsburgh, Pittsburgh, Pennsylvania, founded March 23, 1929.

ALPHA ZETA

College of William and Mary, Williamsburg, Virginia, founded April 19, 1930, (Inactive).

ALPHA ETA

Oklahoma Agricultural and Mechanical College, Stillwater, Oklahoma, founded March 13, 1930.

ALPHA THETA

State College of Washington, Pullman, Washington, founded May, 1930.

ALPHA IOTA

Bucknell University, Lewisburg, Pennsylvania, founded January 9, 1932.

ALPHA KAPPA

Hunter College, New York City, founded January 8, 1932.

ALPHA LAMBDA

University of Utah, Salt Lake City, Utah, founded February 13, 1932.

ALPHA MU

University and State College of Oregon, Eugene-Portland-Corvallis, Oregon, founded November 18, 1933.

ALPHA NU

University of New Mexico, Albuquerque, New Mexico, founded April 21, 1935.

ALPHA XI

Rhode Island State College, Kingston, Rhode Island, founded May 17, 1935.

ALPHA OMICRON

Marquette University, Milwaukee, Wisconsin, founded June 18, 1938.

ALPHA PI

University of Colorado, Boulder, Colorado, founded May 24, 1941.

Taxonomic Study of the Annual Species of Muhlenbergia in the United States

By Charlotte Goodding Reeder

In his Manual of the Grasses of the United States, which was published in 1935, and in the North American Flora which appeared in the same year, Hitchcock described four annual species of *Muhlenbergia* as found in the United States. These, as is true of the genus as a whole, are found mainly in the southwestern United States and in the plateau region of northern Mexico. Together these adjacent regions constitute what is commonly considered the center of distribution for this large genus of grasses, as based upon abundance and diversity of forms.

While working with the members of this genus, difficulty was encountered in using the keys, and some specimens were found which did not coincide with the descriptions. This study which was undertaken to clarify this situation, was made possible through the cooperation of Mr. Jason Swallen and Mrs. Agnes Chase of the United States National Herbarium. The results which are here presented were incorporated by Mr. Swallen in his treatment of Germineae in "Flowering Plants and Ferns of Arizona" by T. H. Kearney and R. H. Peebles (1942), however, explanations for the changes made are brief or more often omitted.

Among the specimens from Arizona were several of *Muhlenbergia texana* Buckl., previously reported only from New Mexico, western Texas, and northern Mexico. After once discovered, it was found in several localities in Arizona, and on more than one occasion was found mixed with other plant specimens on herbarium sheets. Apparently this inconspicuous little annual had been overlooked by botanists, or often confused with an annual species of *Sporobolus* which it closely resembles in habit and general appearance.

More interesting was the discovery of a species heretofore undescribed for the United States. Several years ago it was found by a government field man on the Fort Apache Indian Reservation in southern Arizona, and has been sent in on three or four occasions since then, all from the same general region. Examination of the original descriptions and type material revealed it to be *Muhlenbergia pulcherrima* Scribner. Scribner originally described this species from a specimen in Pringle's collection made in 1887 from Chihuahua, Mexico. The other sheets of the species were all from this northern part of Mexico which borders on Arizona. Those who have observed this little grass in the field in Arizona have been impressed with the amount of variation existing between forms found growing within close proximity. More study is required on this problem.

This genus of grasses is characterized by having spikelets which are one-flowered, each of which is subtended by two bracts or glumes, which are usually shorter than the lemma, though in some cases they are equal to or even slightly longer than the floret. The lemma is 3- to 5-nerved, and usually awned from the tip, though it may be only acute or mucronate. The inflorescence varies from open and diffuse to spicate. It is one of the most difficult genera to characterize, there being so many exceptions and so much variation.

Among the annuals it was found necessary to describe for the first time three new species. Each of the three species had been collected from several localities by different botanists. Previously they had been referred to some existing species with more or less hesitation and question.

Among the material of *Muhlenbergia microsperma* (DC.) Kunth, there were two distinct forms; one of which had small spikelets and spreading panicles, the other which had somewhat larger florets and narrow-appressed inflorescences. These differences along with other minor distinctions seemed adequate for the establishment of a new species, which was called *Muhlenbergia appressa* C. O. Goodding. So far this species is known only from the canyons and slopes of southern Arizona. It is of interest to note a characteristic of these two species, namely the presence of cleistogenes, These cleistogamous spikelets are developed on the lower portions of the plant and are usually solitary or a few in the axils of the lower sheaths. Each such spikelet is included within an indurated, thickened, tightly rolled, narrowly conical, reduced sheath. The whole thing readily disarticulates from the culm at maturity. Within the hardened sheath is an enlarged spikelet which consists of a lemma, palea, and caryopsis which is larger than in the ordinary spikelets. The glumes are wanting, and the awn on the lemma is considerably reduced.

Also among the Arizona specimens were two collections which could not be certainly identified. Careful study and comparison with related forms revealed that they had not been described previously. They most nearly resembled two Mexican species. While at first these two collections seemed to be specifically different, it was found by charting information gathered from herbarium sheets, that the chief distinction was the presence of cilia on the lateral nerves of one. Also a few sheets were found on which both types of plants were represented. These data together with the fact that there was considerable variation in the amount and length of hairs were taken to indicate that these two seemingly different plants were but forms of a polymorphic species, which was called *Muhlenbergia pectinata* C. O. Goodding, in allusion to the comb-like appearance of the lateral nerves. Specimens from moist rocky slopes of Arizona south to Jalisco, Mexico, were referred to this species.

In a collection of *Muhlenbergia depauperata* Scribner from New Mexico, there were discovered some plants which somewhat resembled that species and yet differed sufficiently so that two groups could easily be made even upon superficial examination. Both forms had the characteristic 2-nerved first glume, but the relative size of the glumes to the floret, and the length of the awn on the lemmas differed noticeably. The long-awned material fit the description and illustration of *Muhlenbergia depauperata* Scribner in the Manual. What was this short-awned, long-glumed form? Examination of the original description and of the type material revealed that the name *Muhlenbergia depauperata* Scribner as originally applied referred to the short-awned plant. The other form, possibly not considered as being distinct and being more abundant in the herbaria, had been used as the basis of these later descriptions. Careful study, however, showed the need for a new name and corresponding description for the long-awned form, which was called *Muhlenbergia brevis* C. O. Goodding. Its range extends from Colorado and Texas to Arizona and south to the Federal District, Mexico.

This is only the beginning, for there are still a number of problems to be solved in this large genus which already numbers about 120 species in North America.

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Dr. George Lynn Cross

Dr. George Lynn Cross, acting dean of the graduate college and former head of the departments of botany and bacteriology at the University of Oklahoma, has been named acting president by the board of regents. He replaces Joseph A. Brandt, who became director of the University of Chicago Press January 1.

Mr. Cross, who joined the faculty as assistant professor of botany in 1934, was head of the botany department at the University of South Dakota for four years before going to Oklahoma. He holds bachelor of science and master of science degrees from South Dakota State College, Brookings, and Ph. D. from the University of Chicago. After receiving his doctorate, he remained at Chicago as a research fellow on a Rockefeller grant.

In the autumn of 1942 he was appointed assistant dean of the graduate college at the University of Oklahoma, and was made acting dean when Dean Homer L. Dodge went to Washington as director of the office of scientific personnel of the national research council. Dr. Cross became acting director of the University of Oklahoma Research institute in September, 1942.

He is a member of Sigma Xi, the Botanical Society of America, the Alpha Gamma chapter of Phi Sigma, the American Association for the Advancement of Science, the Cactus and Succulent Society, Torrey Botanical Club and other organizations.

▽ ▽ ▽

Noteworthy Plants of Texas, II

A New Species of Peltandra

FRED A. BARKLEY

(Reprinted from Madrona, Jan. 1944, Vol. VLL, No. 5, pages 131-133)

In a rather inaccessible portion of the sandy oaklands of Robertson County, eastern Texas, is a bog nearly a kilometer long which varies from a few meters to over a hundred in width. At its upper limit the bog has dried sufficiently so that a grass-sedge meadow separates it from the woodland. The peat of the bog varies from a few inches in depth at the upper end to nearly twelve feet near the lower end. This bog apparently overlays a previous peat deposit, since erosion of the stream a short distance below the bog shows over seven feet of old peat exposed under the sand. The dominant species of the bog is *Sarracenia Sledgei* Macf., which occurs in profusion in it in contrast to other bogs which the author has visited in Texas where this species is either absent or at least not abundant. Many of the plants abundant in the other bogs in this area, *Utricularia, Iris, Xyris*, and *Eriocaulon*, are present here in great profusion; also growing here are *Sparganium, Aletris, Dulichium*, and *Hypoxis humilis*, none of which is frequent in this area.

In a swamp along the brook above the bog and again in more abundance along the streamlet running through the bog, especially near the lower end, a plant occurs which apparently is an undescribed species of *Peltandra*. A description of this plant follows:

Peltrandra Tharpii* sp. nov.

Herbacea perennis acaulescens; cormis circa 4.5 cm. longis, 6 cm. latis; foliis erectus, numerosis, lanceolatis, sagittatis, acutis vel acuminatis, subintegris vel integris, lobis ad basin angustis, plus minusve acutis, subpeltatis, petiolis 35±cm. longus, ad basin vaginatis; scapis 20±cm. longis, recurvatis; spathis viridibus, 3.5-4 cm. longis, 1.5-2.5 cm. latis.

Acaulescent perennial with numerous, basal, erect, long-petioled, bright dark green leaves from a large corm, petiole sheathing below, slender above, 3.5±dm. long, blades about 20 cm. long, lanceolate, sagittate, acute to acuminate, subentire, basal lobes narrow, subacute, slightly united, lateral nerves spreading, marginal nerves prominent; scapes about half as long as the petioles, recurving; spathe green, 3.5-4 cm. long, 1.5-2.5 cm. broad, completely enveloping the spadix which is adnate to it for nearly half its length, upper portion staminate, lower pistillate; fruits slightly angled, .7±cm. broad, 1±cm. long.

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*Benjamin Carroll Tharp, born November 16, 1885, at Pankey, Grimes County, Texas, son of Angelina M. A. Jenkin and Edwin Harris Tharp, married Norris Wallis of Rockdale, Texas, September 16, 1914. Two sons: Benjamin Carroll, Jr., September 3, 1919, and George Edwin, December 9, 1921. A.B., University of Texas, 1914, A.M., 1915, Ph.D., 1925. Associate professor of biology at Sam Houston Teacher's College 1917-1919; at the University of Texas since 1919, instructor 1919-1920, adjunct professor 1920-1925, associate professor 1925-1933, professor since 1933, director of the herbarium since 1942.

For over twenty years he has directed the work in ecology and taxonomy at the University of Texas where he has been the inspiration and close friend of many students. As an ecologist he has worked on the vegetation of Texas especially in the range lands, served as scientific expert in the Oklahoma-Texas boundary suit, and made other important contributions. Probably his outstanding scientific contribution is in the field of plant taxonomy, where his work on the flora of Texas rightfully places him as dean of Texas plant collectors.

"University of Texas Herbarium Biographical Sketch 11"—Fred A. Barkley.

Vegetatively this plant is very similar to *Peltandra virginica* (L.) Kunth, but differs in the larger narrower leaves, the shorter scape, and in the much shorter and broader spathe.

Specimens examined. Texas. Robertson County, in bog near New Baden; June 17, 1943, *Barkley 13043;* by stream at center of bog, August 8, 1943, *Barkley 13424* (type, cotypes widely distributed); marsh along stream one-quarter mile above bog, August 13, 1943, *Painter, Waldorf & Barkley 13425*; in water six inches deep in stream thru bog, October 30, 1943, *Tharp, Bradey & Barkley 13698*. All of the above cited specimens are in the University of Texas Herbarium.

* * *

Poisonous Snakes — A Minor Hazard to Soldiers

M. Graham Netting (Alpha Epsilon)
Curator of Herpetology, Carnegie Museum

Quiz-program experts face carefully selected questions once a week; herpetologists, by no means in the same income tax bracket, face a continuous barrage of queries. At present many herpetologists are in the armed services of their countries, others are engaged in war work of one kind or another, and some few are carrying on herpetological work in connection with the war effort (the collection of snake venoms for medical use, for example). At the same time, millions of young men have been moved to areas where they are encountering, only occasionally of course, strange and bizarre serpents. Soldiers are naturally interested in knowing the names and the poisonous qualities of these snakes, so the mail of every herpetologist still working at his trade contains many such inquiries.

Detailed discussion of the distribution or identification of the snakes of the world is beyond the scope of the present paper. It should be pointed out, however, that there is no one recognition mark by which the layman can distinguish a poisonous from a harmless snake. Furthermore, certain venomous foreign species appear superficially similar to some of our innocuous forms.

Some 2400 kinds of snakes are scattered over the world, occurring in virtually every area, climatically suitable, except Ireland, New Zealand, and many smaller islands. Of this number, less than ten per cent are large enough, venomous enough, or common enough to present any real hazard to man. In each region most of the fatalities from snakes are attributable to only a few species, so it is the part of wisdom to learn to identify the villains of your locale. An attractively illustrated booklet, which will enable a soldier to recognize the more frequently observed and dangerous foreign species, is Doris M. Cochran's "Poisonous Reptiles of the World: a Wartime Handbook," obtainable from the Smithsonian Institution, Washington, D. C.

The snake-bite problem is actually divisible by three: 1) persuading people that poisonous snakes are only a minor menace in most parts of the world, 2) suggesting means of avoiding snake-bite accidents in areas where venomous reptiles are prevalent, and 3) outlining first-aid measures to be followed "until the doctor comes."

Snake Hysteria

There can be no doubt that poisonous snakes are feared out of all proportion to the actual harm which they do. In the course of my herpetological studies I cannot claim to have made any profound or startling discoveries, but I believe I fathered the assertion that more North Americans suffer fatal accidents in bath-tubs than succumb to the bites of poisonous snakes. This statement has been widely quoted and has come back to me, in boomerang fashion, from many sources. On one occasion I tried to relieve the apprehension of a questioner, with whom I was talking on the telephone, by remarking that bath-tubs were more dangerous than poisonous snakes, and that if he could approach his morning shower with equanimity he should not allow fear of a snake-bite accident to spoil his pleasure in the out-of-doors. The man astonished me by replying that he knew how dangerous bath-tubs were because he manufactured them, and that if I would invent a non-skid enamel I could make a fortune in a much easier and pleasanter fashion than by studying snakes! In time of war, of course, this comparison is less apt, for where many of our soldiers are fighting they are more liable to encounter poisonous snakes than bath-tubs. Careful estimates indicate that 160 persons per annum *may* have died of snake poisoning in the United States several decades ago, when even physicians resorted to the now generally discredited potassium permanganate treatment. In recent years, widespread use of the incision and suction technique, stemming from the pioneer work of Dr. Dudley Jackson of San Antonio, Texas, and the manufacturer of antivenins (serums) by the Mulford Biological Laboratories of Sharpe and Dohme, have materially reduced the number of fatalities. Accurate statistics are not available, but my belief is that fifty deaths per annum would be a high figure. Certainly for each death caused by a snake, hundreds of our citizens die in automobile accidents, yet I know women—and some men—who scarcely stir from the picnic table for fear of meeting a snake, yet ride nonchalantly home with a driver who would give many a snake hunter the shivers.

Altogether too many people have been frightened by the oft-quoted, but I think exaggerated, estimate of 20,000 deaths from snake-bites each year in India; Java, with a greater population density and many of the same species of poisonous snakes, has only a small number of deaths annually. Whatever the correct figure for India, it should be emphasized that religious beliefs which restrain bare-legged natives from killing cobras that live under houses are largely responsible. Well-shod white residents, with no such aversion to exterminating the local fauna, suffer relatively few snake-bites. It is said that more white men are killed by lightning than by snakes in some parts of the rainy tropics.

I do not believe most of the stories that I have heard about crawling soldiers being startled by face-to-face encounter with a snake, and rearing up —the soldier in this instance, not the snake—in the path of bullets used in training exercises. One such accident may have occurred, but the tale is now being repeated from so many camps that I view it with increasing skepticism. There can be no doubt, however, that many more men in training suffer from snake frights than from snake bites. A soldier writes of maneuvers in a southern camp as follows: "While attacking a hill, one infantryman may strike the ground in his rush advance and fall near a snake. He shouts bloody murder as the 'coachwhip' (a harmless snake) strikes off at a good pace in the opposite direction. The riflemen stop advancing and everything is spoiled." The reported attitude of at least one combat engineer outfit, although it contains elements of exaggeration, could do much to improve morale. This group was located in an area in the central United States where copperheads are especially numerous, and one of the soldiers reported that the training was so exhausting that the men solicited bites so they might have fifteen minutes rest while being treated! Certainly no tough combat engineer should die from a copperhead bite, for during a two-year period, some time ago, 308 much less rugged men, women and children were bitten by copperheads, without a fatality.

Every herpetologist, and every other biologist for that matter, should do his utmost to convince fighting men that, although other animals may be more spectacular, the malaria mosquito is the most dangerous of all animals; it hospitalizes more men than all the snakes, scorpions, centipedes, tarantulas, and other known noxious creatures.

How to Avoid Being Bitten

Once a person has been convinced that poisonous snakes constitute only a slight hazard—but nonetheless one which the prudent should take into consideration—it is feasible to consider the ways and means of lessening the already slight danger of snake-bite.

Snake-bites may be avoided in one of two ways: either by wearing clothing so tough or so thick that fangs cannot pierce to the skin, or by keeping so alert that dangerous snakes are seen and avoided. In pre-war days some firms offered specially tailored breeches, which consisted of a layer of cloth on either side of pliable mesh screen. These snake-proof pants were probably quite effective, but I have yet to encounter a snake collector who could afford a pair. There are devices, however, whereby ordinary clothing can be made more effective in lessening the hazard of snake-bite. Only the largest poisonous snakes, such as the diamond-backed rattlesnake, have fangs of sufficient length to penetrate stout boots. Heavy rubber boots are practically snake proof, but are not suitable for general wear. Many collectors in the tropics prefer leather puttees to laced boots for reasons of both coolness and protection. Wearing trousers outside the boot, rather than tucked in, offers an additional measure of safety. Even ordinary trousers have been sufficient to protect many a wearer against the bites of short-fanged serpents. Some track walkers along copperhead-infested rights-of-way paint their overalls, from knee down, with heavy bridge paint, thus producing a stiff, snake-proof casing.

Pre-war statistics indicated that approximately sixty per cent of all bites were on the feet or legs, about forty per cent on the hands or arms, and one per cent, or less, on the trunk or head. On tropical plantations, where the cutting of underbrush used to result in many snake-induced casualties, the incidence of bites has been decreased by requiring workmen to carry a short stick in the left hand. This stick is used to bend back the vegetation as it is cut off with the machete held in the right hand.

Snakes become overheated rapidly on hot ground; they prefer snoozing in the shade to crawling in the sunlight. Fifteen minutes on intensely heated desert sand will "cook" a rattlesnake. Venomous snakes, especially, prowl at night—like G. I. "wolves." I have known "crackers" who went barefoot by day in good snake country, but who never ventured forth after dark without footwear. Snakes are so easily frightened by footsteps, transmitted to them as ground vibrations, that the passage of a squad of soldiers will cause them to seek places of refuge. Under actual battle conditions, I suspect, but cannot prove, that every terrestrial snake is as far underground as it can go.

Poisonous snakes may concentrate around an established camp because soldiers drop crumbs, mice flock to the feast, and the rodent-eating snakes follow their food supply. It is highly important, therefore, that any man routed out of his hammock or blankets at night take time to pull on his boots —first turning them upside down to shake out scorpions, of course.

What to Do If Bitten

The best advice I can offer to any victim of snake poisoning is to remain firmly convinced that he will survive, to apply first aid if no doctor is at hand, and get to a physician as soon as he can find someone to transport him. Only a physician is qualified to handle emergencies when they arise. Under no circumstances, however, should the soldier be so anxious to place himself under a doctor's (and nurse's) care that he starts at a gallop for the nearest first-aid station. Such unnecessary exertion may mean the difference between an uneventful recovery and a white cross.

There are several good suction-type first-aid kits on the market, and one of these, at least, has been widely distributed to soldiers. The only real drawback to these kits is that, small and compact though they are, they may not always be in the pocket when needed. I keep on hand a supply of Gem razor blades, in their individual wrappers, which have been dipped in hot paraffin to protect them from rusting. I issue blades and brief instructions to soldiers who visit my laboratory, in the hope that such tiny kits may be carried on the person when larger *and better* kits are left behind. The accompanying directions are as follows: "The smallest kit but *not* the best. Adequate for emergency use only. Apt to be at hand when needed if placed in pocket Bible or billfold. In case of poisonous snake bite *(usually 2 tiny round punctures)*, cut deeply through the fang marks. If cutting is done within 30 seconds much venom will be washed out with first rush of blood, and symptoms of poisoning may not develop. Apply handkerchief, G.I. web belt, or shoestring between wound and heart, as a *gentle* tourniquet to *retard* flow of venous blood and lymph *but not tight enough to stop arterial flow.* Place piece of thin rubber over wound and suck. If no rubber is available, suck with mouth anyway—it's far less dangerous than leaving venom in wound. Remember that few husky men die from snake-bite if cutting and sucking are carried out. Keep as quiet as possible, loosen tourniquet every 10 minutes, drink coffee if available, get to first-aid post for further treatment. *Drink no alcohol unless to celebrate your recovery.*"

These directions are the briefest condensation of the recommendations of physicians experienced in the treatment of snake bite that I have been able to evolve. A unique feature of this "Netting Snake Bite Kit," as it has been nicknamed, is that it cannot be purchased anywhere. Copy the directions, or improve them as experience dictates, dip your own razor blades, and hand the ensemble out to as many soldiers as you wish. Ninety-nine per cent of them will never be bitten by a poisonous snake, but the razor blade may prove useful for a variety of purposes!

Paleontology in the Field

J. LeRoy Kay
Carnegie Museum, Pittsburgh, Pa.

Many museums, universities and like institutions send out expeditions and collectors whose duty it is to hunt for and collect fossils. This is the work which may be termed paleontology in the field.

Often it is not necessary to go far from home to make these collections as fossils are found in practically all parts of the earth. However, rocks of all ages are not to be found exposed in one place. Therefore it is necessary to visit many different areas to acquire representative fossils from the various horizons for comparative study.

It is for the purpose of acquiring these fossils from other places and formations that expeditions are sent out not only to the different parts of our own country but into foreign lands as well. In imagination let us take one of these trips and see how the work is carried on. But, for comparison let us first briefly review the methods used in collecting fossils by the early collectors in this country. After riding by train for several days they reach that point on the railroad nearest their destination. From here they will probably have several days or a week yet to travel by horses and wagon before reaching the place they have chosen to begin their search for fossils. The usual method in those days was to outfit at the railroad point. This outfitting meant the buying of horses, wagons, harnesses, saddles, tents, tools and provisions such as food for the men, grain for the horses, and barrels for hauling water for both man and beast as the work often took them miles from any water supply. They had to camp near feed for the horses or take the horses to feed; often all of one man's time was occupied by caring for the horses. In the very early days, before the west was settled by white men, it was often necessary to take armed guards along as a protection against the red-men. There were no bridges across the streams and it was often necessary to go miles out of one's way to find a favorable place to ford.

The methods of collecting were quite different from those used today. They did not have or know the use of various materials for hardening and preserving the fossils that are now in general use and for this reason many specimens were left in the field or brought out as fragments. The specimens were often packed in dry grass in improvised boxes made from any material available and in their long trip by wagon and railroad to their destination were often broken beyond repair. Some collectors used strips of cloth or burlap and flour paste to incase the bones. This method worked very well for blocks not too large, unless the mice and rats which had collected around camp ate the casing on which had been written the label or catalogue number of the fossil. Often the flour paste and cloth casing was poisoned as a protection against these camp pests.

After making a collection of fossils it was necessary to haul, at great effort and expense, the collection to the railroad for shipment to the institution. I know of a collection freighted less than two hundred miles to the nearest railroad point at a cost of four thousand dollars. At the present time this amount would pay all expenses for a fair sized expedition to the west for a season's work of collecting.

Now let us take our interrupted trip, say from Pittsburgh to the same points in the west. There are to be four of us in the party. We leave in a small truck carrying most of our equipment, which consists of much the same things as a modern tourist party would take if they intended to make their own camp, also working equipment such as picks, shovels, bars, chisels, gum arabic, shellac, rice paper, burlap, plaster of paris, etc.

We leave early Monday morning and travel over good roads, stopping a short while at some institutions in the larger cities to renew acquaintances and see what they have discovered since we last visited them. At the end of the week we arrive at our destination ready for our season's work. Instead of barrels of water that the old collector, took along we have only two ten gallon kegs. Having no horses to water, this amount, used economically, will last for a number of days and it is only a matter of an hour or so to take the truck and replenish the supply. We pitch our tents and set up camp at the foot of a butte in the badlands and our first evening is spent around a camp fire recounting our trip and planning our work for the morrow. With the exception of an occasional howl of a coyote from the surrounding buttes the night is perfectly still. We go to our beds early for the dawn comes all too soon in the badlands. At five o'clock the next morning we are cooking our breakfast on the campfire. After breakfast we pack our prospecting bags with the necessary equipment for the day, consisting of a whisk broom for brushing the dirt away from the specimens, some camel hair brushes for the finer cleaning and for applying shellac and gum arabic to the specimens for the hardening process, several small awls and rock chisels, a small hammer, a bottle of gum arabic and one of shellac, a bottle of clear liquid celluloid for the small delicate specimens, a ball of twine and wrapping paper for small packages. We carry in the hand a small prospecting pick weighing about one and one-half pounds, one end being sharply pointed and the other a hoe type. With experience one becomes very efficient with the use of this small pick.

To avoid confusion and duplication the district to be prospected is divided into sections, one for each of the prospectors. The outcrops are to be thoroughly searched. It is often necessary to get down on one's knees to see the smallest fossils. As we leave camp for the day's work we notice many of the desert plants are in bloom. The Evening Primrose (sand lily) and the Prickly Pear are most prominent. The little horned toads and several species of lizards are out sunning themselves.

But look! Here is a fragment of a fossil. It is the lower end of a femur, the upper leg bone of the hind limb of an animal about the size of a small sheep or dog. We look closely at it. There is a small piece of sandstone adhering to it. The specimen must have come from higher up the butte as the formation beneath our feet is a sandy shale. Near the top of the butte we notice a sandstone outcrop and we decide the specimen came from there. We start working our way up the side of the butte and find that there are many fragments of fossil bones on the surface. One is a tooth and on closer examination we decide it is the tooth of an Oreodont, meaning "mountain tooth," so called because of the mountain-like structure of its teeth. It is a small plant-eating animal which has no living relatives. As we reach the sandstone outcrop we find there are a few bones remaining in the rock and after carefully working around some of them we decide that most of the specimen has been weathered out of the rock and decomposed. The pieces that are strewn down the slope of the butte are very fragmentary and as Oreodonts are known from many good specimens this, our first prospect of the morning, is discarded as not being worth while collecting and so we resume our search.

As we carefully work around the base of the butte many fragments of fossil bones are noticed, examined, and because of their decomposed and bleached condition showing that they had been weathered from their former rocky tomb for a long time, they too are discarded.

We now start across a mud flat, so called because of the condition of the sediments when wet, toward another butte or outcrop. Several flat pieces of fossil bone are noticed and prove to be turtle scutes, parts of turtle shells. The sediments are in the intricate pattern of mud cracks caused by their drying out and contracting since the last storm. We come to part of a skeleton of a modern sheep lying on the surface. Some of the bones are missing, having probably been carried or dragged away by carnivores or washed away by the water. The balance may be covered and some day become a fossil. This is a good example of why single fossil bones or parts of skeletons are often found but very seldom a complete skeleton.

We reach the base of the next butte and again begin our search. After picking up and discarding several pieces we find a tooth fragment of what must have been a fair sized animal. The place from which it came is soon found. About fifty feet up the side of the butte the end of a lower jaw is protruding from the shale, this is known to fossil collectors as bone in place and looks like a good prospect. After picking up all fragments that can be found upon the surface we begin carefully working the matrix from the top side of the jaw with our small chisels and hammer. As we uncover the bone we keep applying a thin shellac or gum arabic to the exposed parts to harden and protect it. By further work parts of the other jaw, which had become broken off and is lying at nearly right angles to the first one, are exposed. After considerable painstaking work both jaws are exposed in relief and prove to be the lower jaws of a Diplacodon, a genus of Titanothere, a giant beast which lived during the upper Eocene period.

The specimen can be collected best by the use of plaster of paris and burlap. After pasting rice paper with gum arabic over the bone to keep the plaster from adhering to it a thin solution of water and plaster is prepared and strips of burlap are dipped into this solution and bound around the fossil. The plaster soon sets and hardens. Then, by means of chisels or wedges, the block can be turned over, being careful to keep well below the bones. The matrix is then removed from this side and the plaster burlap operation repeated. The block is given a number and this, together with such data as the collector thinks may help the preparator or scientist in his work upon the specimen, is entered in the field catalogue.

The day is drawing to a close so we wend our way back to camp, prospecting as we go. Other members of the party have returned and we compare stories of our day's work. One of the boys found a turtle. Both the carapace and plastron are present and at least part of the skeleton. While turtles are quite prevalent in certain formations, it is rather a rare case when one finds the skeleton as well as the shells. Another of the boys, who has been holding out for a grand climax, takes from his pocket a small package holding the fruits of his day's work. The package, about one inch in length and half that in diameter, seems a small amount of material for a whole day's work, but it is not the amount but the importance of the specimen that determines its value. This specimen proves the rule for it is part of a jaw containing two teeth of a rabbit. The first record from rocks as old as the Eocene. This find causes everyone to forget they are tired from their first day in the field and they look farward with renewed zest to the work of the next day.

After about two weeks in the field, as the day draws to a close two of the party returning to camp discover on the slope of a butte several small caudal vertebrae. The next morning, after considerable searching which includes cleaning off the loose debris from a large area, the balance of the specimen is found running into the block clay of the hill. Several days are spent in extricating this specimen which proves to be that of a Diplobunops, a very bizarre, upper Eocene mammal having a cat-like body with a long tail, feet like a dog, but which was a plant eater. This is the first skeleton of Diplobunops to be discovered, all former specimens having been merely fragments. The entire specimen can best be taken up in one large plaster block so the articulation of the various bones can be studied while it is being prepared in the laboratory.

The balance of the season is spent in working a Titanothere quarry where a number of skulls and partial skeletons of these giant beasts and one complete skeleton of a titanothere known as Diplacodon are collected. A fossil quarry might be termed a collector's paradise. It is a place where skeletons or skeletal parts of a number of individuals, usually representing several genera, have been deposited in one place. These fossil bones are embedded in the sandstones of an ancient stream bed. The matrix is very hard and we must resort to the use of dynamite to remove the over-burden. After removing this, the bones are chiseled out in relief. Then a chart is made wherein the bones are drawn to an accurate scale showing their association. Each specimen is given a number which is entered in a catalogue with a description of the fossil. The specimens are then taken up in plaster blocks, often using natural cracks as the boundaries. These are given block numbers and the points of contact with other blocks marked and all this information is entered in the catalogue. This record is necessary for the proper assembling of the various parts when they are freed from the matrix in the laboratory.

Many days of painstaking work in the laboratory will be required to prepare this material for study and exhibition. There are many hardships to be endured in collecting fossils, but such incidents as the finding of Diplobunops and Diplacodon make the lot of a fossil collector a pleasant one.

Physiotherapy and the War

VIRGINIA WELSH (Phi Chapter)*

Physiotherapy is one of the oldest forms of treatment; and yet so many modern procedures have been added to its original concepts that it stands forth anew. During World War I in 1917 and 1918 the urgent need of returning the wounded soldiers rapidly to the front lines or rehabilitating them sufficiently for noncombatant duty brought about what might be termed the rebirth of physical therapy. To accomplish this restoration of the disabled requires the employment of heat, massage, graduated exercises, rays, radium, and electricity in various forms. The army learned of its usefulness and developed a great respect for sound physical therapy.

At the end of the war, manufacturers of physical therapy apparatus found a profession eager to learn of this new therapy. Some manufacturers began to delude the profession with advertising literature setting forth unwarranted therapeutic claims for various things; such as stating that ultraviolet rays were a cure-all for every form of disease and making special claims for a particular machine. The situation revived the balmy days of "patent medicines." Conditions in this field were chaotic.

Dr. Joseph Smith of Wisconsin along with many others realizing the deplorable conditions brought forth a resolution which was passed by the American Medical Association in 1925 establishing a Council of Physical Therapy. Today physical therapy has made considerable advance as part of the practice of medicine. Scientific instruction in undergraduate and postgraduate schools, critical research in adequately equipped institutions and authoritative information issued by this council is gradually replacing objectionable propagandizing methods employed by commercial concerns.

The part physical therapy plays in amputations has been developed further in this war. Heat, massage, and exercise—the basic components of physical therapy—play an important part in preparing the stump of an amputated limb for early and efficient function. By developing the circulation, reducing edema, loosening the scar and lessening atrophy, the application of these agents helps in the healing and in preventing further deformity.

In stumps of recent amputations the local circulation usually diminishes and may be increased by heat applied locally at a moderate temperature of 96° F. for 20 minutes every 2 or 3 hours. Increased circulation helps to prevent fibrosis of the muscles, reduces edema, and promotes wound healing. Radiant heat is applied by an infra-red generator or by an electric lamp.

In cases where healing takes place without complications, massage is started 6 or 7 days after amputation. As the condition of the stump permits, 4 types of massage are given in the following sequence: superficial stroking, deep stroking, kneading, and friction. The application of some form of heat, however, usually precedes the treatment. The treatment is given from 10 to 15 minutes daily.

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*One of several papers submitted by Phi Chapter to show type of work done by their initiates. Due to lack of space only one paper could be used.

As healing progresses, exercises may be given such as passive, active, or pressure exercise. All exercises would be prescribed by the surgeon and the physical therapist would instruct the patient in the various exercises.

At present there are 16 approved schools of physical therapy technique. The physical therapy aide has the same rank as a nurse in the army and is in charge of the injured soldiers under the supervision of an army medical officer. Physical therapy has been reborn and is marching forward.

Call for Material

The editor wishes to thank all who have contributed material for use in the journal this year. If you have papers suitable for publication please send them along. It is most discouraging when an appeal is made for material and the answers come back, "We have a member who thinks he can send in a paper for consideration within a month or two." Material needs to be on hand so the journal can be published on time. We are all busy with war work and the extra tasks, but surely we have a few spare moments in which to tell our fellow members over the country what we are doing. We must be united if we are to succeed. For our National welfare we must keep in communication with one another and know what is being done. Even our newsletters give other chapters ideas to use for the betterment of their own problems. No matter where we live we always find we have something in common with someone else which we can share. So let us make Phi Sigma bigger and better by passing our *ideas* and *finds* on for others to use.

Chapter News

Beta

—University of Michigan

The fall semester opened in November. The election of officers which had been postponed last spring on account of the uncertainty of the candidate's plans for this year, was held and the following were elected: President, Wilma Eldersveld; Vice-Pres., Norma S. Olsen; Secretary, Dorothy Marquart; Treasurer, Phyllis Foster. Mrs. Margaret Chapin was appointed Corresponding Secretary.

Beta Chapter is especially interested this year in the research being carried on by its own members, particularly candidates for the doctorate degree. As our first effort in this direction, Mr. James Edney of the Zoology Department presented a resume of his research with parasites entitled, "The Embryological Development of the Reserve Excretory System in *Clinostomum marginatum* and its Significance."

On March ninth, twenty-one new members were initiated into our chapter. Mr. Orlo Childs of the Geology Department gave an illustrated lecture, "The Grand Canyon—its Own Textbook of Biology," after which a social meeting gave us all an opportunity to become better acquainted with the new members.

The next event of interest is a public lecture planned for April 11, when Dr. Lee S. Dice of the University of Michigan Heredity Clinic will discuss his recent work in the field of Human Heredity.

WILMA ELDERSVELD.
President.

Nu

—Washington and Jefferson

Due to the war and the resultant decline in students, Nu Chapter has not been very active. We have every intention of keeping the organization alive during the war, however.

Two of our boys are working hard on problems for honors in Biology and the rest of us are keeping up our regular biological studies.

We held a party in the Biology building on March 10, 1944. The feature was a good home-cooked meal. Dr. Dieter, our faculty advisor, then showed us several reels of very interesting films. This get-together was certainly enjoyed by everyone. Those in attendance included the six active members, Dr. Dieter, and one guest.

Several of us are anticipating entering the service in the near future. The present officers are Robert Chew, President; Jarvis Post, Vice President; Leonard Meyers, Treasurer; Thomas McKee, Secretary.

Things are tough all over!

THOMAS V. MCKEE.
Secretary.

Sigma

—University of Florida

The regular December meeting featured the initiation of new members and was held at Dr. Archie Carr's home. A barbecue held on the grounds adjoining Dr. Carr's home replaced the traditional banquet. The active members and their families attended.

The barbecue scene was a setting of towering pine and gum trees, along the bank of a lively creek. The guests gathered around a bright campfire and were invited to partake of the skillfully barbecued goat meat, savory hush puppies, salads, pickles and doughnuts. Good hot coffee helped in fighting the chill of the moonlit night. An excellent almost pointless meal.

At the close of the barbecue, our president, Mrs. Goin, called the meeting to order and proceeded with the formal initiation of four new members. Mr. J. C. Dickinson, Jr., past president of the chapter and now a St. jgr in the Coast Guard, presented the initiates with their membership certificates and welcomed them into the chapter.

Our January meeting included a very interesting recital by Miss Margaret C.

Johnson of her experiences in Hawaii at the time of the treacherous Pearl Harbor attack and her life on the Islands during the following months when she was called upon to teach aliens. Her talk gave the members a very vivid picture of the problems of mingling races as it appears in the Islands and on the campus of the University at Honolulu, where each student is more or less the offspring of several different races, Asiatic as well as European and American. Illustrations from Hawaiian magazines enabled the audience to realize why Miss Johnson became quite fond of some of the students whose physical appeal matched most happily very bright minds.

Sigma Chapter was extremely fortunate to have as the speaker for the February meeting Mr. Arthur F. McBride. His knowledge of fish and his experience with the Marine Studio, recently at St. Augustine, Florida, proved to be priceless for the chapter. As a topic for his talk he chose, Spawning Behavior of the Pomocentrid Fish. Although Mr. McBride has not completed his observations on the "Sergeant-Major," he was able to bring a number of facts to his listeners with such vividness that they could really see the fish live under their eyes. The changing of color by the male at the time of spawning, its aggressiveness as it clears up the nests, its activity in fanning the eggs during the period of incubation without eating during the process, the shape of the eggs, and their numbers in the nests, are facts which Mr. McBride was able to observe in the large tanks where he kept the fish. Unfortunately those tanks are not favorable to proper spawning and reproduction of the small Pomocentrid fish which Mr. McBride hopes to observe some time more fully in their proper environment in the Florida Keys area.

Yvonne Brannon.
Secretary

Phi

—University of New Hampshire

Phi Chapter is proud of having a mailing list of 50 members on campus for the current year.

On March 1st the chapter initiated 14 members. As a part of the informal initiation Phi Chapter puts each candidate through an oral mental test covering all fields of the biological sciences. This examination is called "council." Several faculty members sit on the council and ask questions. When each candidate has been duly humbled and shown how little he really knows he is given a paper to write as a penalty. The papers must be long enough to consume five minutes when they are presented to the chapter at the first meeting following initiation. The first semester papers were on different phases of the subject "Medicine and the War." The papers the second semester were on men prominent in various fields of science.

The meetings for the year have had many interesting papers presented. Our first meeting was a "Pre-Med" open house night with movies of education and advancement in South America. Our annual Christmas party at the home of Professor Jackson, (charter member of our chapter), and the meetings at which "Tomato Breeding and Disease Investigating," "The Microscope, its Accessories and its Use," The Symposium on The Zoological, Botanical, Horticultural and Bacteriological Aspect of Food Preparation and Preservation were discussed, proved of great worth to the students because they brought forth so much discussion afterwards.

One of our future meetings will deal with the work done at the Isles of Sholes. The University used to offer part of its summer session there, but has discontinued it recently.

Our meetings for the rest of the year will have "Combat," a movie in color furnished by the General Chemical Company, a program on Animal Nutrition presented by the men in the Entomology Department, and a picnic and over night hike which will close the school year.

Our committees have been doing a great deal of work. Our constitution has been revised and brought up to date. All of our Alumni in Durham have been contacted and asked if they cared to be active in our organization. A few of them have returned to our fold.

Fern Drumheller, Ann Flynn and Barbara Brown have been appointed to keep the members of our chapter informed concerning the latest books on Biology acquired by the University. They give a report once a month. The girls are helped in their work by Miss Lurlene Gordon, librarian of the Biological Institute Library.

Phi Chapter is trying to keep its members informed of the most recent happenings in science. We are thinking of appointing a new committee to keep us informed on the various graduate schools and the opportunities open for research.

Helen Ruggles Barratt,
Corresponding Secretary

Alpha Alpha

—University of Southern California

Alpha Alpha Chapter recently received a letter from Dr. A. I. Ortenburger, National Secretary of Phi Sigma, congratulating us on the issuing of a news letter and the publishing of a yearly program. We appreciate his interest in our Chapter. We are doing our best in the present national emergency and trust that these news letters and programs will help bolster the morale of our members now in Uncle Sam's fighting forces. The week-end of March 4th over three hundred of our newsletters were mailed. Some were sent to the South Pacific, the Middle East, and to Europe where our members are to be found on all fronts.

We are very proud of some of our accomplishments for this year. 1st, we solved the banquet problem—a caterer was engaged; the initiation was held before the dinner in the Herbarium; dinner was served in two adjoining Botany Laboratories — the lack of "style" usually present for such occasions was more than replaced by the greater friendliness which prevailed throughout the evening; this was particularly appropriate with Dr. Thorpe's topic, "Keeping Sane in an Insane World." It is our hope that things will continue to be worked out as they occur, and that Alpha Alpha Chapter may continue in the stride which it has attained.

Frances L. Cramer

ALPHA EPSILON

—University of Pittsburgh

The officers of Alpha Epsilon Chapter have been encouraged by the backing given by the members this year. War changed the picture on the campus. The Biology Department was moved from the Cathedral of Learning to Alumni Hall. Facilities were not the same and people who had always taken care of our dinners left and no one was found to replace them. This meant trying a new idea. We have been holding our dinner meetings in the private dining rooms of some of the apartment hotels in the neighborhood. Strange as it may seem those attending have taken to the idea and try to attend regularly.

One of the outstanding programs of the year so far has been a colored motion picture trip through Mexico presented by our president, Miss Helen Worthing.

Another was by Dr. J. Leroy Kay, giving us the intimate life of a paleontological expedition to the badlands of the west. We saw pictures of our Honorary member, Dr. Andrey Avinoff, head of Carnegie Museum, running down butterflies and also doing his part to help find fossils of worth to bring back to the museum.

Last month Dr. A. C. Twoomey of Carnegie Museum spoke to us on his Expedition to the MacKenzie River Delta. The pictures of bird life, the general ecological set up of the region and the Eskimo life were outstanding since they included colored photographs of the nest and nestlings of Red Phalarope which had never been photographed in color before. The discussion following was a lively one and did not break up until 11:30 P.M.

E. H.
Corresponding Secretary

ALPHA XI

—Rhode Island State College

With an all girl roster, Alpha Xi Chapter is carrying on its usual round of activities. In August, Miss Jeanne

Freeman was elected president, Miss Mary Silverman, vice president, and Mr. Richard Smith, Secretary. The latter has recently left for the armed services and Miss Yvonne Hunter was elected to fill the vacancy.

At our fall ceremony, we initiated the Misses Hope Furlong, Dorothy Hebert, Gladys Caswell, Estelle Gahan, Barbara Earle, Lois Pingree, Nancy Thornley, Eleanor Newmarker, and Doris Briden. As guest speaker we had Dr. John G. Albright, head of the Physics Department. He gave a very interesting talk on the rather unique subject of "Spider Silk and its Uses." Dr. Albright and his brother have perfected a method of "milking" the spider and packing the silk for shipment. He has received orders for this valuable material from scientific institutions and from the army as far away as Panama.

On November 15th, Phi Sigma sponsored a lecture by Dr. Harry L. Shapiro, who is chairman of the Department of Anthropology of the American Museum of Natural History and Professor of Anthropology at Columbia University. He spoke of "Human Migrations in Oceania." Earlier in the day at a general college assembly he spoke on "Pitcairn Islanders as a Study in Human Genetics."

Dr. Frank Whitmore, club advisor, gave us a short lecture on a billion and a half year old rock newly acquired by the Geology Department. He explained the method of determining the age of such a rock specimen. At a following meeting we held a round table discussion on "The Future Flora and Fauna of the Earth." It was led by the Doctors Vernon Cheadle and Kenneth Wright of the Botany Department and Dr. Frank Whitmore of the Geology Department. Needless to say, their picture of the future physical aspects of the world was a very gloomy one.

In the near future we plan to initiate Miss Mildred Tatro, Miss Marion Alfred, and Mr. Joseph Daly.

YVONNE S. HUNTER,
Secretary

Eta

—University of Akron

Eta chapter initiated Russell Brant, Thelma Crawford, Stella Alogdelis, Rae Dewey, Helen Baird, and Mary Louise Ahern. Virginia Good and Robert Boehma were pledged.

New faculty members include Mrs. Gladys Robinson, Mr. Sumner Vanica, and Dr. Dudley Peters Glick. Dr. Glick succeeds Professor Rolland D. Fox, founder of Eta chapter, who died suddenly in October.

The present officers are Thelma Crawford, president; Rae Dewey, vice president-treasurer; and Stella Alogdelis, secretary.

On March 2nd, the chapter held an open meeting at which Dr. E. B. Foltz, Eta chapter Honorary member, showed Kodachrome pictures of Alaska, Hawaii and Yellowstone National Park.

At the April meeting Dr. Glick spoke on "Useful Microbes."

An informal meeting at the home of Dr. Walter C. Kraatz, faculty advisor, will close the season's activities. Pledging and initiation will take place at this time.

STELLA ALOGDELIS,
Secretary.

Book Reviews—New Books

Except for the signed Reviews, the Thumbnail sketches of current biological literature appearing in this section are not meant to be exhaustive or deeply critical. They aim to survey the rapidly growing field of biology. Naturally these reviews represent the candid opinions of various readers not necessarily those of the National Council, nor even those of the Editor.

THE PERMEABILITY OF NATURAL MEMBRANES by HUGH DAVSON and J. F. DANIELLI. *The Macmillan Company, Cambridge University Press Department.* 361 pages, including 73 text-figures. $4.75.

Students of biology all realize that the maintenance of life depends upon the entry into the living cell of various substances, such as food, water and oxygen, and the exit from the cell of certain other materials such as nitrogenous wastes and carbon dioxide, but, too often, any attempt at further analysis of the relationships involved is limited to vague references to "osmosis," "change in permeability," etc. This book represents an attempt to summarize the present state of knowledge of the processes and factors involved in the passage of substances through living membranes. These include the cell membrane, a structure about one millionth of a centimeter in thickness, as well as the more obvious structures such as the walls of capillaries. The phenomena of permeability fall roughly into two groups, those in which substances diffuse only from a region of higher to one of lower concentration on both sides of the membrane, and those in which molecules accumulate on one side in excess of the amount on the other. Here, obviously, energy must be expended by the cell and its ability to accumulate or excrete certain substances in this manner must be intimately connected with the structure of the membrane and with the special nature of the cell's metabolic processes. The known facts, particularly those which lend themselves to quantitative treatment, are systematically and logically presented in 21 chapters, about half of which are primarily the work of each of the authors. Bibliographic references are copious and there is an excellent index.

A. O. WEESE.

PHYSICAL BIOCHEMISTRY by HENRY B. BULL. *John Wiley & Sons. New York.* Price $3.75. 1943.

Students of biology have long felt the need of a presentation of the fundamental facts of biochemistry directed especially toward their requirements. I have read the present book with great interest and believe that any reasonably well-prepared graduate student in biology should be able to do the same. The discussion is clear, the illustrations are well chosen, and there is just enough mathematics to develop the essential concepts but not enough to frighten the student. For those who wish to pursue any subject further there are ample footnote references. A course based on this text would be a great improvement, as far as the needs of biological students are concerned, over many now available to them.

A. O. WEESE.

AN OUTLINE OF GENERAL PHYSIOLOGY by L. V. HEILBRUNN. 2nd Ed. Revised. *W. B. Saunders Company,* 1943. $6.00.

The chapters follow one another in easy sequence. The material is up-to-date and as full as a text in this field can be in this constantly changing and experimental world of ours. However, references are given which enable one to continue further study of any point on which he seeks fuller information. Of especial interest was the note to students. It is very fitting because most students dislike the very feature of footnotes and ignore them until they do individual work of their own and learn the value of a book containing a comprehensive bibliography. The book fulfills its purpose of being an outline of brief discussions, which are pertinent and to the point. The possibilities of the electron microscope and the use of new traur elements are included. A very good text to accompany a lecture course in general physiology.

THE THEORY AND PRACTICE OF SEMIMICRO QUALITATIVE ANALYSIS by G. B. HEISIG. *W. B. Saunders Company.* 1943.

A text for the study of Qualitative analysis following a basic course in inorganic chemistry. The laws of mass action and the concepts of Debye, Bronsted and Werner are employed along with the theory of ionization to enable the student to interpret his observations and results correctly. In his directions for laboratory technique the author has given directions for the use of smaller quantities of materials so that valuable time can be saved in making the experiments. Long periods of filtering are thus avoided and more accurate results are obtained. Smaller quantities of material used in this war period greatly reduce the costs of the course. All of the experiments are designed to give the student a thorough knowledge of the activity concept of the cations and anions so he may undertake the determination of unknowns with confidence. The book is well organized and can be used for one semester or two depending upon the needs of individual schools and instructors.

LABORATORY MANUAL OF BIOCHEMISTRY 2nd Ed. Revised by BENJAMIN HARROW. *W. B. Saunders Company, Philadelphia, Pa.* 1944.

The manual has experiments devised to cover carbohydrates, lipids, proteins, enzymes, saliva, milk, gastric digestion, pancreatic digestion, bile, blood, colorimetry, determinations of various constituents in blood, urine, and chromatographic analysis. The directions are simple and can be easily followed. They can be adapted to the use of individual instructors. The questions following each experiment enable the student to determine whether he has followed the directions correctly or not and obtained the proper results in each case. The text material is good and the appendix contains directions for the preparation of standard acid and alkali solutions, along with concentrations of laboratory reagents.

EMULSION TECHNOLOGY—A Symposium. *Chemical Publishing Company Inc., Brooklyn, N. Y.* $5.00. 1943.

A book to give the latest and newest developments on emulsions. Especially is it useful to the investigator, producers and users of emulsions and emulsifiers. The papers point to some very important facts for permanently usable emulsion products, and presents a problem different, therefore, from that of the scientist in the laboratory. One paper outlines the fundamental principles of practical emulsions manufactured in a very general way. Another the actual formulation and production of industrial emulsions. Commercial bulletins are listed. The remaining papers are on the use of highly dispersed emulsions in the treatment of toxaemic conditions; emulsions in the patent literature; industrial emulsion formulation formulas; emulsifying machine design; mode of preparation on the dispersion of soap-stabilised emulsions; application of emulsions used in agricultural spraying; emulsion paints; emulsion in leather industry; rubber latex; asphaltic bitumen and others. The appendix contains the lability test and the recognition of end point. A very good work for the advance of the industry based on scientific facts.

FUNDAMENTALS OF PERSONAL HYGIENE by WALTER W. KRUEGER 4th Ed. *W. B. Saunders Company, Philadelphia.* $1.75. 1944.

A book which can be studied from cover to cover with pleasure and understanding by the student because the material is presented in clear, concise statements, in language that can be readily understood. The pictographs on tuberculosis and exercising give an excellent picture of the facts and follow them through so that the reader can grasp the main points of the entire story in a few minutes. The questions, topics for oral and written reports, plus the bibliography at the end of every chapter bring the text material in review so that the boy or girl studying are thoroughly familiar with each topic. The charts, plates and diagrams are adequate to illustrate the main discussions.

INTRODUCTION TO MICROORGANISMS by LAVERNE RUTH THOMPSON. *W. B. Saunders Company, Philadelphia.* Price $2.75.

A new approach is used for the study of bacteria with special attention being given to what bacteria *do*. The book is divided into units. Laboratory experiences follow each unit. Simplified popular language is used and all new terms are explained as they are introduced. The pictures and charts are adequate for demonstrating the meaning and methods suggested for the study of bacteria, yeasts and molds. The students are given facts which are supported by experimentation. A refreshing method which offers nurses and laboratory workers ways to be efficient and intelligent in their work. An excellent text for all beginning courses in microbiology.

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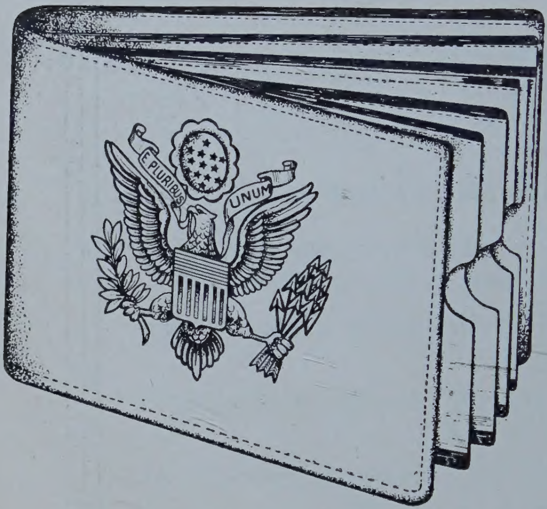

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